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NON-IONIZING ELECTROMAGNETIC EXPOSURE SURVEY AND ENGINEERING EXHIBIT FOR FM LICENSE RENEWAL

PREPARED FOR

American Tower Corporation

TUCSON MOUNTAIN

MULTIPLE TOWER TELECOMMUNICATIONS SITE

TUCSON, ARIZONA

MAY 2013

INTRODUCTION

Hatfield & Dawson Consulting Engineers has been retained by the American Tower Corporation ("ATC") to survey the radiofrequency (RF) exposure conditions at various ground level locations at the Tucson Mountain Telecommunications site, Tucson, Arizona.

STATEMENT OF WORK

Description of the work from ATC Purchase Order #280133: "Multiple Site Name: Tucson Mt / Labor and equipment to perform ground RF survey for public exposure limits. Provide a written report that can submitted to the FCC for the FM license renewal."

Analysis of the results of the surveyed RF exposure conditions can be used by ATC to create a new site RF Safety Program (RFSP). The new RFSP will help to ensure that persons who are authorized to access the Tucson Mountain site will encounter RF exposure conditions that are in compliance with current Federal Communications Commission (FCC) rules and guidelines regarding exposure to RF electromagnetic fields (EMFs).

SITE DESCRIPTION

The Tucson Mountain Telecommunications Site is a multiple tower site located on private land on a remote mountain peak west of Tucson, Arizona. The terrain drops off steeply in all directions from the site. Vehicular access to the site is via a single steep and rugged private dirt road suitable only for four-wheel drive vehicles. Two locked gates along the access road prevent unauthorized access. There are no hiking trails leading to the site. "No Trespassing" and RF warning signs are posted along the road to further discourage casual public access.

The areas having the highest ground level RF exposure conditions at the site are within fenced enclosures with locking gates that restrict both vehicular and pedestrian access.

FCC/OET Bulletin No. 65, Edition 97-01, released in August 1997, includes the following discussion of access control:

> "Restricting access is usually the simplest means of controlling exposure to areas where high RF levels may be present. Methods of doing this include fencing and posting such areas or locking out unauthorized persons in areas, such as rooftop locations, where this is practical. There may be situations where RF levels may exceed the MPE limits for the general public in remote areas, such as mountain tops, that could conceivably be accessible but are not likely to be visited by the public. In such cases, common sense should dictate how compliance is to be achieved. If the area of concern is properly marked by appropriate warning signs, fencing or the erection of other permanent barriers may not be necessary."

Tucson Mountain is a remote mountain top site on private land that is not likely to be visited by the public. There are no permanent users of this site other than the wireless and broadcast tenants. Any other individuals present on this site who are not associated with the communications facilities are trespassing. No evidence of casual public access, such as litter, hiking trails or footpaths leading to the site, were observed at the time of the survey.

As previously noted, there are "No Trespassing" and RF warning signs posted on the locked gates along the single road that leads to the site. Tucson Mountain is considered to be remote within the meaning of the Public Notice dated January 28, 1986, "Further Guidance for Broadcasters Regarding Radiation and the Environment" (FCC Public Notice No. 2278). Therefore appropriate signage is used in place of physical barriers at the Tucson Mountain site to prevent public access to areas where RF exposure conditions exceed the public exposure limits. All persons accessing the site should receive instructions on the meanings of the various RF signs in accordance with the site RFSP.

BROADCAST FACILITIES

There are six towers at the Tucson Mountain site. Each tower is identified by a sign with a single letter A through F. These letters correspond to the tower locations shown on the 1987 facilities map by C. E. Martin Engineers of Tucson, Arizona.

There are no broadcast antennas on tower A which is managed by Crown Castle. A single FM antenna for station KRQQ is mounted atop tower B. No antennas for full-service FM stations are mounted on tower C. The KHYT antenna is mounted atop tower D on the center mast. The antenna for FM station KZLZ is mounted on the lower part of tower D. The new antenna for KLTU is on tower E. Four full-service FM stations have antennas on tower F: KMIY, KIIM, KMXZ and KLPX. The following table lists all licensed broadcast facilities on Tucson Mountain based on information found in FCC databases:

FM Call Sign	Freq. (MHz)	ERP(kW)	Facility ID	TV Call Sign	Channel	ERP(kW)	Facility ID
KLTU(FM)	88.1	16	79359	KOLD-TV	13	0.30	48663
KMIY(FM)	92.9	93	53594	KPCE-LP	29	15	27281
KRQQ(FM)	93.7	93	53591	KUVE-CA,	38	9.97	8036
KRQQ(FM) Aux	93.7	7.5	53591	KHRR(DT)	40	396	30601
KMXZ-FM	94.9	100	2434	KUVE-CA	42	10	78036
KLPX(FM)	96.1	100	2745	KUVE-DT	46	5	63927
KIIM-FM	99.5	93	56052	K48GX(TX)	48	9.9	35704
K267AF(FX)	101.3	0.05	82314	DK57BD(TX)	62	1	67911
K269FV(FX)	101.7	0.25	23447				
KZLZ(FM)	105.3	0.58	36022				
KHYT(FM)	107.5	92	56053				

DESCRIPTION OF RF EXPOSURE SURVEY

An RF exposure measurement survey was conducted on May 8, 2013 by the undersigned. The survey took place on a Wednesday, from approximately 7:00 am to 12 noon local time. Skies were clear and sunny with ambient temperatures in the 80s.

The equipment and measurement procedures used during the survey conform to the most recent FCC guidelines as set forth in FCC/OET Bulletin No. 65, Edition 97-01, released in August 1997.

Exposure measurements were taken with a Narda model 8718 RF Survey Meter, a Narda B8742D Isotropic Shaped-response Electric Field probe (S/N 05003) for General Population / Uncontrolled (i.e., "Public") environments, and a Narda A8742D Isotropic Shaped-response Electric Field probe (S/N 12004) for Controlled (i.e., "Occupational") environments. Both probes were calibrated at the factory within the two months preceding the survey.

This meter and probe combination is a broadband instrument which measures power densities over a wide spectrum as required by IEEE Standard C95.3-2002, *IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz – 300 GHz*.

The meter/probe combinations provide readings of RF exposure conditions in percentage of either the Public or Occupational Maximum Permissible Exposure (MPE) limits allowed by the FCC guidelines, as specified in *CFR 47 §1.1310*. Compliance is determined by comparing the percent readings with the either the 100% Public MPE limit, or the 100% Occupational MPE limit.

GROUND LEVEL RF EXPOSURE ENVIRONMENT

Significant progress has been made during the past decade to reduce RF exposure levels at the Tucson Mountain site. Reports from the 1990s showed that much of the site had areas of excessive exposure conditions due to FM station KRQQ, 93.7 MHz. That station has since changed from a Dielectric Type DCR-G6 antenna to an Electronics Research Inc. (ERI) type SHPX-10-AC antenna atop tower B. The KRQQ contribution to the ground level exposure environment is now less than the contributions from the lower elevation FM antennas.

The dominant contributors to the exposure environment are the two FM stations KMXZ, 94.9 MHz, and KLPX, 96.1 MHz, on tower F on the west side of the site. These two FM stations have interleaved eight-bay antennas centered at about the 70 foot level.

Areas Where Exposure Conditions were Greater than the Occupational MPE limits

The highest exposure conditions anywhere at the Tucson Mountain site were found near tower F within the fence that encloses the tower base. The maximum observed exposure condition in this area was 184% of the Occupational / Controlled Environments Maximum Permissible Exposure (MPE) limit on a spatial peak basis.

Measured exposure conditions exceeded the Occupational MPE limits in certain areas on the Broadcast Building rooftop, near the tower bases and guy anchor points. These areas are within fenced enclosures with locked entry gates, and RF warning signs are posted on the gates.

The RF exposure of persons entering the fenced areas can be reduced to acceptable levels through the use of time-averaging or RF protective clothing. The FM broadcasters at the Tucson Mountain site may collectively or individually reduce power or cease operation as appropriate to reduce exposure conditions to acceptable levels for those persons who must dwell within the fenced areas for extended periods.

Areas Where Exposure Conditions were Greater than the Public MPE limits

There are ground level areas west of the main door to the upper part of the Broadcast Building where measured exposure conditions exceeded the Public MPE limit. These areas, which are within the transmitter site compound, are designated as Occupational / Controlled areas. Building rooftops and guy anchor points are considered part of the controlled area. RF warning signage cautions against casual access to the controlled areas. The highest measured spatial peak exposure condition found in any of the unfenced controlled areas was less than 95% of the Occupational / Controlled environment MPE limit.

Areas Where Exposure Conditions were Less than the Public MPE limits

Measured exposure conditions were well below the General Population / Uncontrolled MPE limit (on a spatial peak basis) on the road leading to the site and the vehicle parking area to the east of the Broadcast Building. All accessible interior areas within the various buildings had measured exposure conditions less than 30% of the Public MPE limit.

The areas east of a demarcation line extending from the main door of the broadcast building northeast to the central generator building can be accessed by untrained members of the general public. These publicly accessible areas include the parking areas, the chemical toilet adjacent to the central generator building, the interiors of all buildings, the eastern satellite dish pads and the dish pads and air-conditioner units adjacent to the south and east sides of the broadcast building.

RECOMMENDATIONS

The managers and tenants of the Tuscon Mountain site shall adopt a new written RFSP.

This report refers to areas which have RF exposure conditions consistent with Controlled (i.e., "Occupational") Environments. Individuals who access any Controlled Environment area must adhere to the provisions of a written Tucson Mountain site RFSP. Occupational exposure limits apply only to those persons who have received RF safety training.

Only individuals who have received the benefits of RF Safety training in accordance with the Tucson Mountain site RFSP should be allowed access to the outdoor ground level areas and rooftops within the transmitter site compound west of the main door to the upper part of the Broadcast Building.

Prominent signage shall be erected near the the main door to the upper part of the Broadcast Building so that all persons entering the site from the parking area will understand that a Controlled area exists to the west of the door, and that any person entering that Controlled area must agree to the provisions of the RFSP and sign a log book to that effect.

Persons should be cautioned to remain at least three feet away from all guy wires and anchor points. Persons who have not received training as part of a site-specific RFSP must remain outside of the designated Controlled areas of the site.

COMPLIANCE

Persons who remain outside of the designated Controlled areas of the site will experience exposure conditions that are less than the General Population / Uncontrolled Exposure Public MPE limit. Therefore the licensed broadcast facilities at the Tucson Mountain site are in compliance with FCC rules and guidelines regarding ground level public RF exposure.

The licensed FM broadcasters at the Tucson Mountain site will take all steps necessary to ensure that the RF exposure of persons who enter the Controlled areas of the site remain below the FCC Occupational / Controlled Environment MPE limit. This will be accomplished through RF safety training and/or power reductions and transmitter shut-downs as described in Tucson Mountain Telecommunications site RFSP.

CONCLUSION

A new RF Safety Program (RFSP) for Tucson Mountain site should be created in order to minimize the RF exposure of authorized personnel who access the Controlled areas of the site. Persons who are authorized to access the site are required to follow the written RFSP. The RFSP may specify power reductions and auxiliary switching of certain broadcast transmitters. Additional and/or alternative safety measures, including the wearing of RF protective garments, and the use of time-averaged RF exposure may be incorporated into the site RFSP.

The recommendations and conclusions presented in this report are based on FCC rules and recommendations, and the comparison of predicted and measured RF conditions in specific areas with the corresponding safe exposure limits set forth in the FCC rules. The FCC exposure limits are based on recommendations by federal and private entities with the appropriate expertise in human safety issues. Under the Commission's rules, licensees are required to ensure compliance with the limits for maximum permissible exposure (MPE) established by the FCC. These limits have been developed based on guidelines provided by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and the National Council on Radiation Protection and Measurements (NCRP). Both the NCRP and IEEE guidelines were developed by scientists and engineers with a great deal of experience and knowledge in the area of RF biological effects.

QUALIFICATIONS

I am a Senior Member of the IEEE. As a partner in the firm of Hatfield & Dawson Consulting Engineers I am registered as a Professional Engineer in the States of Washington, Oregon, California and Hawaii. I am an experienced radio engineer with over 30 years of professional engineering experience, whose qualifications are a matter of record with the Federal Communications Commission, and I hold an FCC General Radiotelephone Operator License PG-12-21740.

All representations contained herein are true to the best of my knowledge.

23 May 2013

David J. Pinion, P.E.